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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

January 5, 1994

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Re: PR Docket No. 93-61
Automatic Vehicle Monitoring Systems

Dear Mr. Caton:

The Telecommunications Industry Association (TIA) hereby requests that the attached correspondence between Dr. Jay Padgett, Chairman of its Mobile & Personal Communications Consumer Radio Section, and Mr. Yair Karmi of PacTel Teletrac, be included in the file of the above docket.

Please contact the undersigned if you require additional information.

Sincerely,

A handwritten signature in dark ink, appearing to read "Dan Bart", is written over the typed name.

Daniel L. Bart
Vice President, Technical and Regulatory Affairs

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Mr. Yair Karmi
Vice President, Technology Development
PacTel TeletracSM
9800 La Cienega Blvd., Suite 800
Inglewood, CA 90301-4420

January 4, 1994

Dear Yair,

This is in response to your letter of December 22 (attached), in which you solicit specific technical characteristics of various Part 15 devices as input data to a computer simulation. Unfortunately, I do not have access to the detailed information you seek. Moreover, there are undoubtedly Part 15 devices planned for the 902-928 MHz band, or even already deployed, of which I am unaware. Therefore, I believe the most effective means of information exchange between Teletrac and the Part 15 community would be a meeting for the planning of whatever experiments and/or simulations are needed.

Clearly, a computer simulation is one tool that can be used to assess the impact of Part 15 interference on Teletrac's system. One problem with this approach is that it can become quite complex when many different devices and characteristics are involved. In addition, it can be difficult to perform "sanity checks" on complex simulation results to determine whether a result is realistic, or whether it arises from a programming error or some numerical anomaly. I therefore believe that as a prelude to any such simulation, we should jointly plan a set of fairly simple tests that involve only a single Teletrac receiver, rather than the entire system. If the results of those tests indicate that a more complex simulation is warranted, the test results can serve as a benchmark against which the simulation results can be checked.

As discussed in the notes on interference tests which I included with my November 24 letter to CZ, probably the first, and most critical step of this process, is a complete characterization of the Teletrac receiver. Contrary to the implication in paragraph 3 of your letter, Teletrac has not provided the data necessary to support a complete assessment of the potential for interference with the operation of its system by Part 15 devices. While a receiver characteristic was shown in Fig. 12 of Appendix 2 to Teletrac's Comments in PR Docket 93-61, it was limited to a carrier-to-noise ratio (CNR) only down to -25 dB, and the noise power was -80 dBm. Characterization also is needed for CNR levels below -25 dB, and for higher noise and interference power levels (e.g., -40 dBm) to explore AGC (automatic gain control) and A/D (analog-to-digital) converter dynamic range effects. This

could be done in the lab rather than the field, and should not require a substantial amount of time. I believe it would involve an equipment setup similar to that used to generate the data shown in Teletrac's Comments, with different signal and noise power levels. An enhancement would be to introduce multipath effects via a fade simulator.

Once we have a complete characterization of the Teletrac receiver, I believe that we can analyze interference effects in a straightforward manner. As you point out, propagation models are well-known and documented in the technical literature. To quantify the effect of the Part 15 devices, I believe the best approach would be to develop a small set of "reference model" Part 15 interference sources with key characteristics (transmit power, bandwidth, hopping rates, etc.) that are representative of devices likely to populate the band.

In any event, I would encourage Teletrac to reconsider its position and meet with myself and others from the Part 15 community to plan a work program to quantify the potential for interference to Teletrac's system from Part 15 devices. I believe that such an activity is in the public interest, because only when we understand the interference potential can we provide sound technical guidance to the Commission in support of the Rule Making process.

We plan to fully discuss this issue during our winter Section meeting later this week. In addition, I have contacted Steve Schear, Chairman of the Part 15 Coalition, who has indicated that the first week in February may be a good time to hold the first planning meeting. I will contact you following our Section meeting to determine your availability to participate in this activity.

Regards,

A handwritten signature in black ink, appearing to read "Jay E. Padgett", with a stylized flourish at the end.

Jay E. Padgett
Chairman, TIA MPC
Consumer Radio Section

cc:

Daniel L. Bart - TIA
Ralph A. Haller - Chief, FCC Private Radio Bureau
Steve Schear - Chairman, Part 15 Coalition
Eric J. Schimmel - TIA
Thomas P. Stanley - Chief Engineer, FCC

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PACTEL
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December 22, 1993

Dr. Jay Padgett
AT&T Bell Labs
Room 4J-626
101 Crawfords Corner Road
Holmdel, NJ 07733-3030

Dear Jay:

CZ asked me to respond to your letter dated November 24, regarding the continuation of the process to assess the potential interference between Part 15 units and the Teletrac system, as well as Part 15 units among themselves.

We are confident that our system can operate under reasonable conditions in a band shared with units operating under Part 15, reasonable being defined by the interference level that these devices can tolerate themselves. To test this assumption, the amount of interference created by Teletrac to Part 15 units, Part 15 units to Teletrac and part 15 units among themselves can be determined by means of a statistical simulation, once the data is available and the scenarios agreed upon.

To this day, PacTel Teletrac has been the only company providing data that can be used to implement such simulation. The location of our sites is also available. The models for RF propagation in the urban and suburban environments are well known and documented in literature. The missing inputs for the simulation are the data regarding devices operating under Part 15 in the 902-928 MHz band.

We have not yet received technical information regarding such Part 15 devices. Accurate information is mandatory if the simulation is to be valid and useful. Since you chair the TIA Mobile and Personal Communications Committee dealing with Part 15 cordless phones, I am confident that you can explain to your partners on the Committee the importance of information that will support assessment of the quality of the service their customers may expect. You may also have good contacts with other Part 15 manufacturers and, if this is so, could help the process by providing

Dr. Jay Padgett
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To provide the correct picture of service availability, the simulation will have to consider the capability of each unit to operate within its acceptable operational parameter, i.e., as a communication user; to estimate the capability of other such users to operate, the simulation has to estimate the level and type of noise present at the input of each unit, primarily due to the signals emitted by all devices in their role as sources of interference. Therefore, the information that each manufacturer should provide should include all data required to consider its devices as users and interferers. A preliminary list of such data includes:

- Operating frequency (or frequencies) and frequency plan
- Transmitted power
- Antenna gain (a statistical antenna pattern may be required for a realistic 3D simulation)
- Sensitivity of the receiver (performance as a function of SNR) in the presence of in-band and adjacent channel interference
- Modulation scheme and symbol rate
- In-band and out-of-band spectral characteristics
- Sequence of communication events, their duration and respective statistics. It is important to identify failure conditions and recovery procedures for each event.
- Typical scenarios in terms of distribution of units in urban and suburban environments, in- and out-of-building deployments, antenna heights and distance between units comprising a link.

As soon as the information is collected, I recommend we get together to define the extent, resources and schedule of the simulation. My direct-dial office telephone number is 310-338-7192.

Sincerely yours,



Yair Karmi
Vice President
Technology Development